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Empathy, burnout, and antibiotic prescribing for acute respiratory infections:

a cross-sectional primary care study in the US

Abstract

Background
The impact of physician–patient relationship factors, such as physician empathy and burnout, on antibiotic prescribing has not been characterised.

Aim
To assess associations between physician empathy and burnout and antibiotic prescribing for acute respiratory infections (ARIs) in primary care.

Design and setting
Cross-sectional study of primary care practices in the Cleveland Clinic Health System in the US.

Method
Patient and prescribing data were obtained from the medical record. All patients with primary diagnoses of ARIs from 1 January 2012 to 31 December 2013, except those with chronic obstructive pulmonary disease (COPD) or who were immunocompromised, were included. Physician empathy was measured using the Jefferson Scale of Empathy while physician burnout was measured using the Maslach Burnout Inventory. The relationship between empathy and burnout and antibiotic prescribing, adjusted for patient and provider characteristics, was analysed using multiple linear regression.

Results
In 5937 ARI visits to 102 primary care physicians, the median proportion resulting in antibiotic prescribing was 48.6% (interquartile range [IQR] 24.1% to 70.0%). Neither physician empathy (correlation coefficient [β] 0.005, 95% confidence interval [CI] = −0.001 to 0.010, *P* = 0.07) nor any burnout measures were significantly associated with antibiotic prescribing: emotional exhaustion (β 0.001, 95% CI = −0.005 to 0.006, *P* = 0.79), tendency to depersonalise patients (β −0.009, 95% CI = −0.021 to 0.003, *P* = 0.13), and sense of personal accomplishment (β −0.004, 95% CI = −0.014 to 0.006, *P* = 0.44).

Conclusion
The authors found no significant association between empathy or burnout measures and antibiotic prescribing for ARIs in primary care. Other physician characteristics should be investigated to explain individual variation in antibiotic prescribing.

Keywords
antibacterial agents; physician; physician–patient relations; prescribing patterns; primary health care; respiratory tract infections.

INTRODUCTION

Inappropriate antibiotic use, a major public health issue, has been linked to the emergence of drug resistance and contributes directly to increased medical costs.[1] Previous studies in outpatient settings have found increasing use of antibiotics for acute respiratory infections (ARIs),[2] contrary to best-practice guidelines.[3]

Patient- and physician-level predictors of antibiotic prescribing include patient age, diagnosis, patient volume, physician age, provider type (physician versus non-physician), physician specialty, and geographic region.[2,4] Interventions such as delayed prescribing have successfully reduced antibiotic use among groups of physicians.[5] Little is known, however, about the effect of individual physician characteristics on prescribing habits. Dynamics of the physician–patient interaction — especially the physician's response to real or perceived patient demands — have been hypothesised to explain variability in prescribing.[6]

Some physicians have reported that being empathetic towards patients was useful for lowering inappropriate prescribing.[7] Furthermore, empathising with patients has been proposed as a strategy for reducing prescribing.[8] Burnout, too, might affect physicians' willingness to engage in efforts to discourage patients from requesting inappropriate antibiotics. However, the impact of physician psychological characteristics, such as empathy and burnout, on antibiotic prescribing has not been formally assessed. In an integrated health system, the authors investigated whether primary care physicians' levels of self-reported empathy and burnout were associated with prescription of antibiotics for ARIs.

METHOD

Setting and participants

The Cleveland Clinic is an integrated non-profit academic health system with 36 primary care practices in Northeast Ohio. Primary care physicians in the US, who play a role in healthcare delivery similar to GPs in the UK, may have training in family medicine or internal medicine. Cleveland Clinic primary care physicians are salaried employees of the health system working within multidisciplinary practices that include other providers, such as nurse practitioners, pharmacists, dieticians, social workers, and patient educators, similar to an increasing number of GPs in the UK.[9]

Cleveland Clinic practices vary from small offices with two to three physicians to large multispecialty family health centres. The authors included all patients ≥18 years who presented to primary or urgent care practices at the Cleveland Clinic with an ARI, as defined

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How this fits in

Although empathising with patients has been proposed as a strategy for reducing antibiotic prescribing, this is the first study investigating the relationship between physician empathy or burnout, and the likelihood of prescribing antibiotics for acute respiratory infections (ARIs). The authors found that neither physician empathy nor burnout were significantly associated with antibiotic prescribing. Expressing empathy for patient concerns may not be an effective way for GPs to reduce antibiotic prescribing. Investigation into other physician characteristics is needed to explain the large individual variation in antibiotic prescribing for ARIs.

by International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 381–382 and 460–466, from 1 January 2012 to 31 December 2013 (Appendix 1). The authors excluded patients for whom antibiotics might always be appropriate, including those with a history of chronic obstructive pulmonary disease (COPD) or who were immunocompromised for any reason, as identified by ICD-9 code.

Measurements

For each patient encounter, the authors retrieved patient characteristics from the medical record and identified the physician. They recorded patient age, sex, race, smoking status, insurance status, principal diagnosis, additional diagnoses, temperature, blood pressure, pulse, body mass index (BMI), and O_2 saturation. Patients were considered to have received an antibiotic if they were prescribed an antibiotic on the day of the visit.

As part of an 8-hour relationship-centred communication skills course offered to all Cleveland Clinic physicians and advanced clinical care providers, participants completed a pre-course survey that included the Jefferson Scale of Empathy (JSE) and the Human Services version of the Maslach Burnout Inventory (MBI). Pre-course survey dates for physicians identified as described above ranged from 9 July 2013 to 28 August 2014.

The JSE is a validated instrument for measuring empathy in physicians that comprises 20 questions on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree). Possible scores on the JSE range from 20 to 140, with higher scores representing greater empathy.[10,11] The MBI is a validated instrument for measuring burnout in human services workers, including primary care physicians,[12] comprising 22 questions on a seven-point frequency scale (0 = never, 6 = every day) summarised in emotional exhaustion (EE), depersonalisation (DP), and personal accomplishment (PA) subscales. Possible scores for EE range from 0 to 54, with higher scores indicating greater feelings of emotional exhaustion. Possible scores for DP range from 0 to 30, with higher scores indicating greater cynical or impersonal feelings towards one's patients. Possible scores for PA range from 0 to 48, with higher scores indicating a greater sense of accomplishment and competence in one's work.[13] The JSE and the MBI were used with permission. Survey data were stored in a registry approved by the Cleveland Clinic Institutional Review Board (IRB). Physician participation in the registry was optional. The authors matched physicians' proportions of antibiotic prescribing during the study period to their demographic, empathy, and burnout characteristics by National Physician Identification (NPI) number. Physicians with missing data for any JSE or MBI question were excluded.

Statistical analysis

The authors summarised the data as median and interquartile range for continuous variables, and number (*n*) and per cent for categorical variables. Adjusted prescribing rates were computed for physicians by controlling for patient characteristics in logistic regression models. The characteristics were sex, race, age, temperature, systolic and diastolic blood pressure (BP), pulse, BMI, O_2 saturation, smoking status, history of diabetes, asthma, congestive heart failure (CHF) and end-stage renal disease (ESRD), insurance, and income. The authors characterised the bivariate relationship between each physician's adjusted antibiotic prescribing proportion and physician characteristics, JSE, and MBI scores using the two-sample *t*-test or linear regression, as appropriate. They then assessed the relationship between the patient-adjusted antibiotic prescribing proportion and JSE and MBI scores using multiple linear regression to adjust for physician sex, type, specialty, years in practice, and number of ARI visits. All analyses were conducted using JMP Pro 12 (SAS Institute) and R (cran.r-project.org).

With the number of physicians and the number of predictors in the model, the study had a power of 80% to detect a partial correlation of 0.21 (two-sided type I error = 0.05). The calculation was performed with SAS 9.4 (Cary, NC).

RESULTS

The final dataset included 5937 ARI visits to 102 primary care physicians (median 40.5 visits per physician, IQR range 19.75 to 80.75). The median proportion of ARI visits for which physicians prescribed antibiotics was 48.6% (IQR 24.1% to 70.0%). The authors excluded 159 other physicians because they were missing data for at least one JSE or MBI question. Those excluded did not significantly differ in antibiotic prescribing frequency from those included. Physician characteristics are presented in Table 1. The median JSE score was 120 (IQR 111 to 126.25), and the median MBI-EE, MBI-DP, and MBI-PA scores were 22 (IQR 14 to 31.5), 6 (IQR 3 to 10.25), and 42.5 (IQR 45 to 38), respectively.

In unadjusted analyses physician empathy, feeling of emotional exhaustion, and sense of personal accomplishment were not significantly associated with antibiotic prescribing (Table 1). Physician tendency to depersonalise patients was associated in unadjusted analysis with lower antibiotic prescribing (correlation coefficient [β] –0.011, 95% confidence interval [CI] = –0.021 to –0.002, *P* = 0.02). In the multivariable analysis, there was an association between higher empathy and more prescribing that did not reach significance (β 0.005, 95% CI = –0.001 to 0.010, *P* = 0.07), while no measure of burnout was significantly associated with antibiotic prescribing (Table 2).

Table 1. Physician characteristics

	Physician (*n* = 102)	[a]Bivariate association with antibiotic prescribing, *P*-value
Sex, *n* (%)		0.52
Female	52 (51)	
Male	50 (49)	
Specialty, *n* (%)		0.81
Family medicine	42 (41)	
Internal medicine	60 (59)	
Median years in practice (IQR)	15 (8 to 21)	0.13
Median number of ARI patient visits (IQR)	40.5 (19.75 to 80.75)	<0.001
Median Jefferson Scale of Empathy score (IQR)	120 (111 to 126.25)	0.59
Median Maslach Burnout Inventory — Human Services Survey score (IQR)		
Emotional exhaustion subscale	22 (14 to 31.5)	0.55
Depersonalisation subscale	6 (3 to 10.25)	0.02
Personal accomplishment subscale[b]	42.5 (45 to 38)	0.69
Median proportion of antibiotic prescribing (IQR), %	48.6 (24.1 to 70.0)	N/A

[a]Two-sample t*-test. [b]Lower scores indicate more burnout. ARI = acute respiratory infection. IQR = interquartile range.*

Each additional ARI visit increased the probability of antibiotic prescribing by 0.2 percentage points (β 0.002, 95% CI = 0.001 to 0.003, *P*<0.001). (Table 2). When the number of ARI visits was excluded from the multivariable analysis, each point increase in MBI-DP decreased the probability of antibiotic prescribing by 1.3 percentage points (β –0.013, 95% CI = –0.025 to –0.001, *P* = 0.04).

DISCUSSION

Summary

In this observational study of 5937 patient visits to 102 primary care physicians, the authors found wide variation in antibiotic prescribing for ARIs. Physicians who saw more patients for ARIs had lower levels of depersonalisation but were more likely to prescribe antibiotics. After adjusting for number of ARI visits, however, physician empathy, feelings of emotional exhaustion, a tendency to depersonalise patients, and a sense of personal accomplishment were not significantly associated with antibiotic prescribing.

Strengths and limitations

This is the first study (to the authors' knowledge) to investigate the relationship between physician empathy or burnout and antibiotic prescribing. As this was not an experimental study, unmeasured confounding affecting antibiotic prescribing is possible. Additionally, empathy and burnout were assessed during and after the period when antibiotic prescribing was measured, attenuating the association between the two. However, both the JSE and the MBI have reasonable test–retest reliability over 3 to 4 months and a year, respectively, suggesting that they were relatively stable over the study period.[11,13,14] The authors were not able to measure whether the clinician's level of empathy and burnout had an impact on the type of relationship that they formed with their patient. For instance, the relationship between clinician-reported empathy and expressions of empathy in the patient encounter is unknown. Finally, the sample size may have been inadequate to find a significant relationship between empathy and antibiotic prescribing. Based on the post-hoc power calculation, such a relationship would not be large.

Comparison with existing literature

In a large study of the Veterans Affairs health system, Jones *et al* found that individual physician variation in antibiotic prescribing was the single largest source

Table 2. Multivariable linear regression of physician characteristics and antibiotic prescribing

	β coefficient (95% CI)[a]	*P*-value
Sex (female)[b]	0.002 (–0.114 to 0.117)	0.98
Specialty (family medicine)[c]	–0.037 (–0.140 to 0.067)	0.48
Years in practice	0.004 (–0.002 to 0.010)	0.20
Number of ARI patient visits	0.002 (0.001 to 0.003)	<0.001
JSE	0.005 (–0.001 to 0.010)	0.07
MBI-EE	0.001 (–0.005 to 0.006)	0.79
MBI-DP	–0.009 (–0.021 to 0.003)	0.13
MBI-PA	–0.004 (–0.014 to 0.006)	0.44

[a]Antibiotic prescribing proportions were enumerated on a scale from 0 to 1. The β coefficient represents the change in prescribing proportion for each point increase in the explanatory variable. [b]Compared with male sex (reference category). [c]Compared with internal medicine (reference category). ARI = acute respiratory infection. JSE = Jefferson Scale of Empathy. MBI-DP = Maslach Burnout Inventory, depersonalisation. MBI-EE = Maslach Burnout Inventory, emotional exhaustion. MBI-PA = Maslach Burnout Inventory, personal accomplishment.

of antibiotic prescribing variance across levels of healthcare delivery, accounting for 59% of all variation.[2] Specific physician characteristics were not assessed. To the authors' knowledge, this study is the first to examine the association between physician empathy or burnout and antibiotic prescribing. Others have investigated the relationship between physician empathy and burnout with other clinical outcomes: Hojat and colleagues found that, among family physicians, higher empathy was associated with lower glycated haemoglobin (HbA1c) and low-density lipoprotein cholesterol (LDL-C) levels in patients with diabetes.[15] In contrast, Rabatin *et al* did not find any association between physician burnout and blood pressure control, diabetes control, screening for colon cancer or depression, or tobacco use advice in a primary care setting.[16] This study, too, found no significant association between physician burnout or empathy and antibiotic prescribing after controlling for the effects of patient volume. Because burnout and volume are often related, they might be expected to measure similar things. Interestingly, burnout and number of ARI visits were inversely related, perhaps reflecting a less stressful practice for those who saw many urgent-care-type visits.

Implications for research

Being empathetic towards patients with ARIs has been suggested as a method for reassuring patients and reducing their demand for antibiotics. However, the authors found a trend towards more frequent prescribing of antibiotics among empathetic physicians. It is possible that more empathetic physicians are more sympathetic to patient requests and therefore are more likely to prescribe antibiotics. Burnout has also been hypothesised to influence physician behaviour, including adherence to best practice and guidelines. Burned-out physicians might capitulate more easily to patient demands and prescribe an antibiotic in order to end the visit, or they may be less likely to sympathise with patients with ARI condition and refuse to prescribe one. Further work should explore how the setting may affect the extent to which empathy or burnout is associated with prescribing — for instance, physicians in solo or small group practices may differ from those in a large integrated health system, and differences in healthcare access and delivery across countries may affect physicians' prescribing patterns. These findings suggest that any effect of physician empathy or burnout is insignificant compared with other as yet unidentified sources of individual variation.

Investigation into other possible sources of physician variation in antibiotic prescribing for ARIs, such as physician knowledge of prescribing guidelines or of adverse effects of antibiotic prescribing for ARIs, may more fully explain antibiotic overuse and lead to possible interventions.

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Ethical approval

The Cleveland Clinic IRB approved this study under protocol number 14-291.

Provenance

Freely submitted; externally peer reviewed.

Competing interests

The authors have declared no competing interests.

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Appendix 1. ICD-9-CM codes

Diagnosis code	Description
38 100	Acute nonsuppurative otitis media, unspecified
38 101	Acute serous otitis media
38 102	Acute mucoid otitis media
38 103	Acute sanguineous otitis media
38 104	Acute allergic serous otitis media
38 105	Acute allergic mucoid otitis media
38 106	Acute allergic sanguineous otitis media
38 110	Chronic serous otitis media, simple or unspecified
38 119	Other chronic serous otitis media
38 120	Chronic mucoid otitis media, simple or unspecified
38 129	Other chronic mucoid otitis media
3813	Other and unspecified chronic nonsuppurative otitis media
3814	Nonsuppurative otitis media, not specified as acute or chronic
38 150	Eustachian salpingitis, unspecified
38 151	Acute eustachian salpingitis
38 152	Chronic eustachian salpingitis
38 160	Obstruction of eustachian tube, unspecified
38 161	Osseous obstruction of eustachian tube
38 162	Intrinsic cartilagenous obstruction of eustachian tube
38 163	Extrinsic cartilagenous obstruction of eustachian tube
3817	Patulous eustachian tube
38 181	Dysfunction of eustachian tube
38 189	Other disorders of eustachian tube
3819	Unspecified eustachian tube disorder
38 200	Acute suppurative otitis media without spontaneous rupture of eardrum
38 201	Acute suppurative otitis media with spontaneous rupture of eardrum
38 202	Acute suppurative otitis media in diseases classified elsewhere
3821	Chronic tubotympanic suppurative otitis media
3822	Chronic atticoantral suppurative otitis media
3823	Unspecified chronic suppurative otitis media
3824	Unspecified suppurative otitis media
3829	Unspecified otitis media
460	Acute nasopharyngitis (common cold)
4610	Acute maxillary sinusitis
4611	Acute frontal sinusitis
4612	Acute ethmoidal sinusitis
4613	Acute sphenoidal sinusitis
4618	Other acute sinusitis
4619	Acute sinusitis, unspecified
462	Acute pharyngitis
463	Acute tonsillitis
46 400	Acute laryngitis without mention of obstruction
46 401	Acute laryngitis with obstruction
46 410	Acute tracheitis without mention of obstruction
46 411	Acute tracheitis with obstruction
46 420	Acute laryngotracheitis without mention of obstruction
46 421	Acute laryngotracheitis with obstruction

... continued

Appendix 1 continued. ICD-9-CM codes

46 430	Acute epiglottitis without mention of obstruction
46431	Acute epiglottitis with obstruction
4644	Croup
46 450	Supraglottitis unspecified, without obstruction
46451	Supraglottitis unspecified, with obstruction
4650	Acute laryngopharyngitis
4658	Acute upper respiratory infections of other multiple sites
4659	Acute upper respiratory infections of unspecified site
4660	Acute bronchitis
46 611	Acute bronchiolitis due to respiratory syncytial virus (RSV)
46 619	Acute bronchiolitis due to other infectious organisms